

PATENT

Application No. 10/725,074
Attorney Docket No. 067437-5009-US01
(Former Nos. 186116/US/5; 469390-00094)

REMARKS

Reconsideration of this Application is respectfully requested. Upon entry of the foregoing amendments, claims 1-10, 13-28 and 31 are pending in the application, with claims 1, 17 and 23 being the independent claims. Claims 11, 12, 29 and 30 have been canceled without prejudice or disclaimer. Support for the subject matter of the amended claims is contained in the application as originally filed. Because the foregoing changes introduce no new matter, their entry is respectfully requested.

Based on the above Amendment and the following Remarks, Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Objections to the Specification

The Examiner objected claim 4 on the basis that the claim was not further limiting. Applicants respectfully submit that the rejection of the claim is overcome by the accompanying amendment thereto. In particular, claim 4 now further limits the positively claimed pipette tip arrays.

Rejections under 35 U.S.C. § 112

The Examiner has rejected claims 23-31 under 35 U.S.C. §112, second paragraph as being indefinite. Applicants respectfully submit that the rejection of claims 23-31 are overcome by the accompanying amendment thereto. In particular, claim 23 now sets forth several elements which form the pipette tip array, including a plurality of pipette tips, a flexible membrane, and a sealing agent.

The Invention

Higher density microplates, for example, microplates having 96, 384, 1536 or more wells, are increasingly used to promote efficiency and reduce costs. The present invention is directed to a sealing element, a pipette tip array, and a multichannel pipette system which are

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particularly suited for use with such higher density microplates. In particular, the present invention is directed to clamping and sealing features which are particularly suited for disposable pipette tip arrays.

Some known devices often use individual disposable tips instead of the pipette tip array of the present invention. Such known devices generally require a means of (i) presenting the individual disposable tips in a manner compatible with standard microplate formats, and (ii) creating a seal for each individual disposable tip. As the density of tips increases, it is increasingly difficult to present disposable tips in a manner compatible with the microplate format. This is particularly true for the 1536 density microplate. It also is increasingly difficult to provide a seal for each disposable tip. For example, if the tips are pressed onto the dispense head, the force required to ensure an adequate seal of tips increases with the number of tips. Such known devices would benefit from the sealing element and other similar features of the present invention.

Other known devices use an array of fixed non-disposable tips instead of the pipette tip array of the present invention. These known devices generally require a means of cleaning their tips. Such known devices would benefit from the removable tip array and clamping features of the present invention, which features would facilitate cleaning and/or replacement of pipette tips.

Still other known devices are configured as an array of individual pipettors, each with its own sealing element. When a seal fails in such known devices, replacement of the failed seal can be cumbersome. The seal replacement may need to be performed by a specially trained technician as opposed to the user. This is even true of hand pipettors as it is common for users to have maintenance and calibration performed by a specially trained technician. In contrast, the present invention is designed for easy disassembly such that the user can replace seals and/or tip arrays as needed.

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Rejections under 35 U.S.C. § 102 and 103***Claims 1-16***

The Examiner has rejected claims 1-16 under 35 U.S.C. § 102 and 103 as being anticipated by, or unpatentable over one or more of U.S. Patent No. 7,105,132 to Shumate et al. ("Shumate"), U.S. Patent Application Publication No. 2004/0033554 to Powers ("Powers"), U.S. Patent No. 6,869,571 to Ingenhoven et al. ("Ingenhoven") and U.S. Patent No. 4,444,062 to Bennett et al. ("Bennett"). Shumate, Powers, Ingenhoven and Bennett, taken individually or combined, fail to teach or suggest the multichannel pipette system of the present invention set forth in amended claim 1, which has been amended to include the membrane and clamp limitations of dependent claims 11 and 12. For the Examiner's convenience, amended claim 1 is reproduced below.

1. (Currently amended) A multichannel pipette system for aspirating and/or dispensing fluid into multiple fluid receptacles comprising:
a pipettor having at least one body and two or more plungers;
one or more removable pipette tip arrays, wherein the removable pipette tip arrays mate to the at least one body of the pipettor, and wherein each tip array has more than one tip;
a flexible membrane positioned between the pipette tip arrays and the plungers, the membrane forming a static seal with the tip arrays, wherein the flexible membrane is connected to the one or more removable pipette tip arrays by one or more clamps.

Shumate, Powers and Ingenhoven fail to disclose a membrane, much less teach or suggest a membrane positioned between a pipette tip array and a plunger.

With reference to Bennett, the Examiner notes that elastic rubber membrane 24 is secured to an upper frame and sandwiched between two respective sections of the frame. It is unclear whether the Examiner considers Bennett's O-rings 26, 69 the frame, or considers Bennett's housing 12, and barrel member 52 the frame. In either event, Bennett fails to teach or suggest a clamp connecting the flexible membrane to a pipette tip array. In fact, Bennett teaches away from the claimed invention because such a clamp is not necessary with Bennett's device. With

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reference to FIG. 1, Bennett's O-ring 26 holds membrane 24 to housing 12 (while O-ring 69 holds diaphragm 68 to barrel member 52). Threaded apertures 56 and screws 54 are used to secure barrel member to housing 12 and, in turn, hold membrane 24 and diaphragm 68 in place. As such, the presently claimed clamp configuration would be wholly redundant in the Bennett device.

In contrast, the multichannel pipette system of the present invention includes a clamp (e.g., clamping mechanism 140) which attaches a membrane (e.g., flexible membrane 110) to a pipette tip array (e.g., pipette tip array 100). As such, the membrane may be attached directly to the pipette tip array.

For at least these reasons, Applicants respectfully submit that Shumate, Powers, Ingenhoven and Bennett, taken individually or combined, do not anticipate or render obvious independent claim 1. Applicant submits that claims 2-10 and 13-16, which depend from claim 1, are allowable over the cited art for at least the same reasons noted above.

Claims 17-22

The Examiner has rejected claims 17-22 under 35 U.S.C. § 102 as being anticipated by Bennett. Bennett fails to teach or suggest the sealing element of the present invention set forth in amended claim 17. For the Examiner's convenience, amended claim 1 is reproduced below.

17. (Currently amended) A sealing element for forming a seal between a pipettor and tip arrays of a multichannel pipettor comprising:
a rigid frame having [[a-center]] an open central region and being configured for engagement with one or more tip arrays of a multichannel pipettor;
and a flexible membrane attached to the frame, such that the membrane covers the [[center]] central region of the first frame.

As discussed above, the Examiner notes that elastic rubber membrane 24 is secured to an upper frame and sandwiched between two respective sections of the frame. It is unclear whether the Examiner considers Bennett's O-rings 26, 69 the frame, or considers Bennett's housing 12, and barrel member 52 the frame.

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In the event the Examiner considers the O-rings the recited frame, Bennett teaches away from a rigid frame having an open central region. Alternatively, if the Examiner considers the housing and/or barrel member the recited frame, Bennett again teaches away from a rigid frame having an open central region.

In contrast, the multichannel pipette system of the present invention includes a frame (e.g., frame 510) configured for attaching a membrane (e.g., flexible membrane 110) to a pipette tip array (e.g., pipette tip array 100). As such, the frame allows direct attachment to the pipette tip array.

For at least these reasons, Applicants respectfully submit that Bennett does not anticipate independent claim 17. Applicant submits that claims 17-22, which depend from claim 17, are allowable over the cited art for at least the same reasons noted above.

Claims 23-31

The Examiner has rejected claims 23-31 under 35 U.S.C. § 102 as being anticipated by each of Shumate, Powers, Ingenhoven and Bennett. Shumate, Powers, Ingenhoven and Bennett, taken individually or combined, fail to teach or suggest the pipette tip array of the present invention set forth in amended claim 23, which has been amended to include the membrane and sealing limitations of dependent claims 29 and 30. For the Examiner's convenience, amended claim 23 is reproduced below.

23. (Currently amended) A pipette tip array for use with a multichannel pipettor to aspirate and/or dispense fluid into multiple fluid receptacles comprising:
a plurality of pipette tips extending from a base;
a flexible membrane attached to the plurality of pipette tips; and
a sealing agent sealing the flexible membrane to the base.

As noted above, Shumate, Powers and Ingenhoven fail to disclose a membrane, much less teach or suggest a membrane positioned between a pipette tip array and a plunger. With reference to Bennett, the Examiner was silent as to any form of sealing fluid or agent.

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The pipette tip array of the present invention includes a sealing agent to attach a membrane (e.g., flexible membrane 110) to the base (e.g., base 126) of a pipette tip array (e.g., pipette tip array 100). As such, the membrane is attached directly to the pipette tip array.

For at least these reasons, Applicants respectfully submit that Shumate, Powers, Ingenhoven and Bennett, taken individually or combined, do not anticipate or render obvious independent claim 23. Applicant submits that claims 22-28, 30 and 31, which depend from claim 23, are allowable over the cited art for at least the same reasons noted above.

CONCLUSION

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

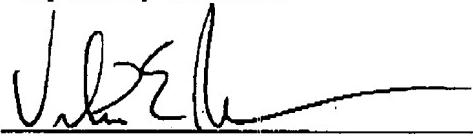
The Commissioner is hereby authorized to charge any underpayment of fees associated with this communication, including any necessary fees for extension of time or additional claims, and/or credit any overpayment to Deposit Account No. 50-0310 (Order No. 067437-5009-US01; Former Docket No. 186116/US/5; 469390-00094).

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Prompt and favorable consideration of this Amendment and Response is respectfully requested.

Respectfully submitted,

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